

UNCLASSIFIED

| ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit) | | | | | | | DATE February 2000 | | |
|--|-------------------|---------------------|---------------------|--|---------------------|---------------------|------------------------------|---------------------|------------|
| BUDGET ACTIVITY 7 - Operational System Development | | | | PE NUMBER AND TITLE 0203735A Combat Vehicle Improvement Programs | | | | | |
| COST (In Thousands) | FY 1999 Actual | FY 2000 Estimate | FY 2001 Estimate | FY 2002 Estimate | FY 2003 Estimate | FY 2004 Estimate | FY 2005 Estimate | Cost to Complete | Total Cost |
| Total Program Element (PE) Cost | 89010 | 83271 | 99423 | 103657 | 19864 | 47821 | 92048 | Continuing | Continuing |
| D2TT Bradley A3 IOTE | 2994 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10064 |
| D330 Abrams Tank Improvement Program | 8769 | 36487 | 82659 | 90649 | 19864 | 38402 | 67545 | Continuing | Continuing |
| D344 Fire Support Team Vehicle Integration | 6414 | 11283 | 2154 | 0 | 0 | 0 | 0 | 0 | 80395 |
| D371 Bradley Base Sustainment Program | 57787 | 24777 | 0 | 0 | 0 | 9419 | 24503 | Continuing | Continuing |
| D718 Ground Combat Vehicle HTI | 8846 | 7847 | 12125 | 12512 | 0 | 0 | 0 | 0 | 41418 |
| DC64 DC64 | 4200 | 2877 | 2485 | 496 | 0 | 0 | 0 | 0 | 85548 |

A. Mission Description and Budget Item Justification: This Program Element (PE) responds to vehicle deficiencies identified during Desert Storm, continues technical system upgrades, and addresses needed evolutionary enhancements to tracked combat (Abrams and Bradley) and tactical (Bradley FIST) vehicles. This PE provides combat effectiveness and Operating and Support (O&S) cost reduction enhancements for the Abrams Tank, through a series of product improvements to the current M1A1 and M1A2 vehicles. Additional improvements allow the M1A2 SEP tank to operate effectively with the M2A3 Bradley. This PE also addresses future product improvements to the M2A3, and the Abrams tank fleet.

Page 1 of 19 Pages
Exhibit R-2 (PE 0203735A)

UNCLASSIFIED

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)

DATE
February 2000

BUDGET ACTIVITY

7 - Operational System Development

PE NUMBER AND TITLE

0203735A Combat Vehicle Improvement Programs

| B. Program Change Summary | <u>FY 1999</u> | <u>FY 2000</u> | <u>FY 2001</u> |
|---|----------------|----------------|----------------|
| Previous President's Budget (FY 2000/2001 PB) | 104000 | 29544 | 23938 |
| Appropriated Value | 104756 | 84544 | |
| Adjustments to Appropriated Value | | | |
| a. Congressional General Reductions | -756 | | |
| b. SBIR/STTR | -3531 | | |
| c. Omnibus or Other Above Threshold Reductions | -1623 | -346 | |
| d. Below Threshold Reprogramming | -9300 | | |
| e. Rescissions | -536 | -827 | |
| Adjustments to Budget Years Since FY 2000/2001 PB | | | +11585 |
| New Army Transformation Adjustment | | TBD | +63900 |
| Current Budget Submit (<u>FY 2001</u> PB) | 89010 | 83271 | 99423 |

Change Summary Explanation: Funding – FY 2001: Project D330 was adjusted (+63900) to reflect the New Army Transformation; additional funding (+11585) was realigned to support the common digitization effort.

UNCLASSIFIED

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|--|-------------------|---------------------|---------------------|---|---------------------|---------------------|-----------------------|---------------------|----------------------|
| BUDGET ACTIVITY 7 - Operational System Development | | | | PE NUMBER AND TITLE 0203735A Combat Vehicle Improvement Programs | | | | PROJECT D330 | |
| COST (In Thousands) | FY 1999 Actual | FY 2000 Estimate | FY 2001 Estimate | FY 2002 Estimate | FY 2003 Estimate | FY 2004 Estimate | FY 2005 Estimate | Cost to Complete | Total Cost |
| D2TT Bradley A3 IOTE | 2994 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10064 |
| <p>A. Mission Description and Justification: This project provides for the initial operational test and evaluation (IOTE) of Bradley A3 pre-production vehicles in order to generate a system performance profile in support of a Milestone III decision. Critical areas for test include lethality, survivability, mobility, and sustainability.</p> <p>FY 1999 Accomplishments:</p> <ul style="list-style-type: none"> • 2994 Testing Support [LUT 2 and planning for Initial Operational Test and Evaluation (IOTE)] <p>Total 2994</p> <p>FY 2000 Planned Program: Program not funded in FY 2000.</p> <p>FY 2001 Planned Program: Program not funded in FY 2001.</p> | | | | | | | | | |
| B. Other Program Funding Summary | <u>FY 1999</u> | <u>FY 2000</u> | <u>FY 2001</u> | <u>FY 2002</u> | <u>FY 2003</u> | <u>FY 2004</u> | <u>FY 2005</u> | To <u>Compl</u> | Total <u>Cost</u> |
| Bradley Base Sustainment (G80717) | 270102 | 299225 | 373270 | 399607 | 394328 | 412440 | 410157 | Cont | Cont |
| <p>C. Acquisition Strategy: All funding in this project will be executed for Operational Tests by OEC.</p> | | | | | | | | | |
| D. Schedule Profile | <u>FY 1999</u> | <u>FY 2000</u> | <u>FY 2001</u> | <u>FY 2002</u> | <u>FY 2003</u> | <u>FY 2004</u> | <u>FY 2004</u> | <u>FY 2005</u> | |
| LUT 2 | 4Q | | | | | | | | |
| IOTE | | 4Q | | | | | | | |
| COST (In Thousands) | FY 1999 Actual | FY 2000 Estimate | FY 2001 Estimate | FY 2002 Estimate | FY 2003 Estimate | FY 2004 Estimate | FY 2005 Estimate | Cost to Complete | Total Cost |
| D330 Abrams Tank Improvement Program | 8769 | 36487 | 82659 | 90649 | 19864 | 38402 | 67545 | Continuing | Continuing |
| <p>A. Mission Description and Justification: This project funds improvements to the Abrams Main Battle Tank (M1 series). The Abrams mission is to close with and destroy enemy forces on the integrated battlefield using firepower, maneuver, and shock effect. The current production model, the M1A2, is the Army's first fully digital</p> | | | | | | | | | |

Project D330

Page 3 of 19 Pages

Exhibit R-2A (PE 0203735A)

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|--|--|--|
| | | DATE February 2000 |
| BUDGET ACTIVITY 7 - Operational System Development | | PE NUMBER AND TITLE 0203735A Combat Vehicle Improvement Programs |
| <p>ground combat system. The M1A2 System Enhancement Program (SEP) is the name given to the latest group or “block” of improvements funded under this project. SEP is an upgrade to the computer core that is the essence of the M1A2. It provides better microprocessors, color flat panel displays, more memory capacity, better Soldier-Machine Interface (SMI), and a new open operating system. An Under Armor Auxiliary Power Unit (UAAPU) was developed for potential future integration into the production M1A2 SEP. A new thermal management system dissipates the heat generated by the electronic components. The M1A2’s formidable target acquisition capabilities will also be significantly enhanced with the 2nd Generation Forward Looking Infra-Red (2nd Gen FLIR) technology. Both the Gunner’s Primary Sight (GPS) and the Commander’s Independent Thermal Viewer (CITV) include the improved thermal imaging capabilities of the new FLIR technology.</p> <p>The first M1A2 SEP production tank was delivered to the Government on 1 Sep 99. The M1A2 SEP tank will be capable of running the Army’s Common Operating Environment (ACOE) software for digital communication with the rest of the combined arms team. ACOE software integration is funded in PE 0203758A. Its computer systems will also accommodate future growth without significant hardware changes. A program to digitize the M1A1 tank began in FY 1997. The development effort for this is being funded by PE 0203758A. An M1A2 Live Fire Testing Program is planned for fiscal years 2000-2003. Post SEP efforts will focus on improvements yielding significant life cycle cost reductions or survivability enhancements. In support of the new Army vision, a new engine will be developed for production and phased integration into the Abrams tank fleet. The objective is a lighter, more reliable, more fuel efficient, and easier-to-repair engine. The added FY2000 funding by PE 0603005A will allow this project to begin earlier. The Abrams Project Manager and the TRADOC System Manager (TSM) both support a re-capitalization effort that will accelerate development enough to complete the project by FY2003.</p> <p>FY 1999 Accomplishments:</p> <ul style="list-style-type: none">• 3074 Continued engineering and testing of hardware/software on tank, logistics, quality and other engineering efforts• 2839 Provided Government Support/GFE• 2856 Conducted Direct Support Electrical System Test Set (DSESTS) engineering efforts <p>Total 8769</p> <p>FY 2000 Planned Program:</p> <ul style="list-style-type: none">• 4033 Integration of embedded Battlefield Combat Identification System (BCIS) into the M1A2 SEP tank• 100 M1A2 SEP contract completion costs• 1400 Provide Government Support• 500 Begin design of improved engine for the Abrams Family of Vehicles <p>FY 2000 Planned Program: (continued)</p> <ul style="list-style-type: none">• 6523 Begin M1A2 Abrams Live Fire and Survivability Test, including pre-shot analysis and start of test shots• 9400 Begin engineering efforts to upgrade the Abrams engine• 970 Begin lightweight vehicle track development• 4159 Begin development of M1A2 test program sets, and Abrams 1st and 2nd generation health check system• 8420 Begin program for redesign of turret and hull network boxes and built-in test embedded diagnostic program for the M1A1 fleet• 982 Small Business Innovative Research / Small Business Technology Transfer Programs | | |

UNCLASSIFIED

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|---|----------------|----------------|--------------------|--|----------------|----------------------------|------------------------------|------------------------|----------------------|
| ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit) | | | | | | | DATE February 2000 | | |
| BUDGET ACTIVITY 7 - Operational System Development | | | | PE NUMBER AND TITLE 0203735A Combat Vehicle Improvement Programs | | | | PROJECT D330 | |
| Total 36487 | | | | | | | | | |
| FY 2001 Planned Program: | | | | | | | | | |
| <ul style="list-style-type: none"> • 13820 Continue M1A2 Abrams Live Fire and Survivability Test, including live fire shots, simulation and purchase of system support package • 4500 Continue design of improved engine for the Abrams Family of Vehicles • 439 Complete program for redesign of turret and hull network boxes and built-in test embedded diagnostic program for the M1A1 fleet • 63900 Funds will be used in support of the New Army Vision / Transformation (New Engine) | | | | | | | | | |
| Total 82659 | | | | | | | | | |
| B. <u>Other Program Funding Summary</u> | | | | | | | | | |
| | <u>FY 1999</u> | <u>FY 2000</u> | <u>FY 2001</u> | <u>FY 2002</u> | <u>FY 2003</u> | <u>FY 2004</u> | <u>FY 2005</u> | To <u>Compl</u> | Total <u>Cost</u> |
| Abrams Upgrade Program (GA0750) | 689056 | 633062 | 512867 | 580535 | 471970 | 372705 | 189296 | 453500 | |
| Abrams Vehicle Modification (GA0700) | 25997 | 31645 | 36098 | 170945 | 32131 | 404998 | 391168 | Cont | |
| M1A1D Retrofit (GA0720) | 0 | 0 | 891 | 11575 | 12939 | 6017 | 24036 | Cont | |
| System Enhancement Pgm: SEP M1A2 (GA0730) | 0 | 0 | 36149 | 58343 | 87184 | 89808 | 89749 | Cont | |
| M1A2 Training Devices (GB1302) | 13298 | 8050 | 10504 | 11741 | 12035 | 12855 | 5785 | Cont | |
| Training Device Mod (GA5208) | 8464 | 2628 | 5331 | 5511 | 5492 | 5800 | 3352 | Cont | |
| Initial Spares (GE0161) | 9699 | 9713 | 14807 | 23408 | 25182 | 25326 | 25290 | Cont | |
| PE 0203758A (D374) | 13555 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| PE 0603005A (D532) | 0 | 4773 | 0 | 0 | 0 | 0 | 0 | 0 | |
| C. <u>Acquisition Strategy:</u> General Dynamics Land Systems Division (GDLS) is the prime contractor for this development program. | | | | | | | | | |
| | | | | | | | | | |
| Project D330 | | | Page 5 of 19 Pages | | | Exhibit R-2A (PE 0203735A) | | | |

UNCLASSIFIED

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)

DATE

February 2000

BUDGET ACTIVITY

7 - Operational System Development

PE NUMBER AND TITLE

0203735A Combat Vehicle Improvement Programs

PROJECT

D330

| D. Schedule Profile | <u>FY 1999</u> | <u>FY 2000</u> | <u>FY 2001</u> | <u>FY 2002</u> | <u>FY 2003</u> | <u>FY 2004</u> | <u>FY 2004</u> | <u>FY 2005</u> |
|--|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Complete Government/Contractor Testing | 3Q* | | | | | | | |
| Contract Completion | 3Q* | | | | | | | |
| Begin Live Fire Planning/Testing | 1Q* | | | | | | | |
| Complete Live Fire Testing | | | | | 4Q | | | |

* Milestone Completed

UNCLASSIFIED

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ARMY RDT&E COST ANALYSIS (R-3)

DATE

February 2000

BUDGET ACTIVITY

7 - Operational System Development

PE NUMBER AND TITLE

0203735A Combat Vehicle Improvement Programs

PROJECT

D330

| I. Product Development | Contract Method & Type | Performing Activity & Location | Total PYs Cost | <u>FY 1999 Cost</u> | <u>FY 1999 Award Date</u> | <u>FY 2000 Cost</u> | <u>FY 2000 Award Date</u> | <u>FY 2001 Cost</u> | <u>FY 2001 Award Date</u> | Cost To Complete | Total Cost | Target Value of Contract |
|-------------------------------|------------------------|---------------------------------------|----------------|---------------------|---------------------------|---------------------|---------------------------|---------------------|---------------------------|------------------|------------|--------------------------|
| a. Prior Contracts | | | 472549 | | | | | | | | 472549 | 472549 |
| b. SEP/FLIR Phase I | SS-CPFF | General Dynamics | 4688 | | | | | | | | 4688 | 6984 |
| c. SEP/FLIR Phase II | SS-CPFF | General Dynamics Sterling Heights, MI | 115762 | | | 100 | | | | | 115862 | 137900 |
| d. FLIR Integration | C-CPAF | Texas Instruments McKinney, TX | 25000 | | | | | | | | 25000 | 25000 |
| e. BCIS Integration | TBD | | | | | 4033 | | | | | 4033 | |
| f. Future Contracts | TBD | | | | | 10870 | | 68839 | | | 79709 | |
| SBIR / STTR | | | | | | 982 | | | | | 982 | |
| Subtotal Product Development: | | | 617999 | | | 15985 | | 68839 | | | 702823 | |

Remark: GDLS contracts (Phase I / Phase II) include funding from 0203758A / D374 and 0604649A / DG26.

| II. Support Costs | Contract Method & Type | Performing Activity & Location | Total PYs Cost | <u>FY 1999 Cost</u> | <u>FY 1999 Award Date</u> | <u>FY 2000 Cost</u> | <u>FY 2000 Award Date</u> | <u>FY 2001 Cost</u> | <u>FY 2001 Award Date</u> | Cost To Complete | Total Cost | Target Value of Contract |
|-------------------------|------------------------|--------------------------------|----------------|---------------------|---------------------------|---------------------|---------------------------|---------------------|---------------------------|------------------|------------|--------------------------|
| a. Gov't Support / GFE | MIPR | TACOM / OGA's | 44625 | 2839 | | 1400 | | | | | 48864 | |
| b. DSESTS Requirements | MIPR | TACOM / OGA's | | 2856 | | 12579 | | | | | 15435 | |
| Subtotal Support Costs: | | | 44625 | 5695 | | 13979 | | | | | 64299 | |

| III. Test and Evaluation | Contract Method & Type | Performing Activity & Location | Total PYs Cost | <u>FY 1999 Cost</u> | <u>FY 1999 Award Date</u> | <u>FY 2000 Cost</u> | <u>FY 2000 Award Date</u> | <u>FY 2001 Cost</u> | <u>FY 2001 Award Date</u> | Cost To Complete | Total Cost | Target Value of Contract |
|-------------------------------|------------------------|--------------------------------|----------------|---------------------|---------------------------|---------------------|---------------------------|---------------------|---------------------------|------------------|------------|--------------------------|
| a. Various Test Sites | MIPR | | 40178 | 3074 | | 6523 | | 13820 | | | 63595 | |
| Subtotal Test and Evaluation: | | | 40178 | 3074 | | 6523 | | 13820 | | | 63595 | |

IV. Management Services: Not applicable

| | | | | | | | | | | | | |
|---------------------|--|--|--------|------|--|-------|--|-------|--|--|--------|--|
| Project Total Cost: | | | 702802 | 8769 | | 36487 | | 82659 | | | 830717 | |
|---------------------|--|--|--------|------|--|-------|--|-------|--|--|--------|--|

Project D330

Page 7 of 19 Pages

Exhibit R-3 (PE 0203735A)

UNCLASSIFIED

| ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit) | | | | | | | | DATE February 2000 | |
|--|-------------------|---------------------|---------------------|--|---------------------|---------------------|---------------------|------------------------------|----------------------|
| BUDGET ACTIVITY 7 - Operational System Development | | | | PE NUMBER AND TITLE 0203735A Combat Vehicle Improvement Programs | | | | PROJECT D344 | |
| COST (In Thousands) | FY 1999 Actual | FY 2000 Estimate | FY 2001 Estimate | FY 2002 Estimate | FY 2003 Estimate | FY 2004 Estimate | FY 2005 Estimate | Cost to Complete | Total Cost |
| D344 Fire Support Team Vehicle Integration | 6414 | 11283 | 2154 | 0 | 0 | 0 | 0 | 0 | 80395 |
| <p>A. Mission Description and Justification: The Bradley Fire Support (BFIST) vehicle program provides an integrated Bradley –based fire support platform that allows company fire support teams to plan, coordinate execute and direct timely, accurate, indirect fires and fire support. The BFIST consists of a Bradley A2 ODS or Bradley A3 vehicle with an integrated mission package designed to provide unique capabilities to the fire support community.</p> <p>FY 1999 Accomplishments:</p> <ul style="list-style-type: none"> • 5594 M3A3 BFIST ECP Development • 172 M7 ODS BFIST IOTE Planning • 648 Program Management <p>Total 6414</p> <p>FY 2000 Planned Program:</p> <ul style="list-style-type: none"> • 8944 M3A3 BFIST ECP Development • 1450 M7 ODS BFIST IOTE Testing • 586 Program Management • 303 Small Business Innovative Research/Small Business Technology Transfer Programs (SBIR/STTR) <p>Total 11283</p> <p>FY 2001 Planned Program:</p> <ul style="list-style-type: none"> • 1468 M3A3 BFIST ECP Development • 300 M3A3 Testing • 386 Program Management <p>Total 2154</p> | | | | | | | | | |
| B. Other Program Funding Summary | <u>FY 1999</u> | <u>FY 2000</u> | <u>FY 2001</u> | <u>FY 2002</u> | <u>FY 2003</u> | <u>FY 2004</u> | <u>FY 2005</u> | To <u>Compl</u> | Total <u>Cost</u> |
| GZ2300 FIST Vehicle (M7/A3 BFIST) | 24513 | 27115 | 31898 | 35706 | 47052 | 47318 | 38019 | 15013 | 284701 |
| <div style="display: flex; justify-content: space-between; padding: 10px;"> Project D344 Page 8 of 19 Pages Exhibit R-2A (PE 0203735A) </div> | | | | | | | | | |

UNCLASSIFIED

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)

DATE
February 2000BUDGET ACTIVITY
7 - Operational System DevelopmentPE NUMBER AND TITLE
0203735A Combat Vehicle Improvement Programs PROJECT
D344

C. Acquisition Strategy: The program office accepted the first Low Rate Production (LRIP) M7 ODS BFIST in Mar 99 from United Defense L.P. LRIP awards for years one and two have been awarded for a total of 49 systems. Production Verification Testing was successfully completed in Aug 99, with a combined BFIST/Striker IOTE scheduled for Apr 00. The Third and final LRIP award is planned for Mar 00. A Cost Plus Award fee (CPAF) contract to integrate the M7 BFIST fire support functionality onto the M3A3 chassis was awarded in Jul 99.

| D. Schedule Profile | <u>FY 1997</u> | <u>FY 1998</u> | <u>FY 1999</u> | <u>FY 2000</u> | <u>FY 2001</u> | <u>FY 2002</u> | <u>FY 2003</u> | <u>FY 2004</u> | <u>FY 2004</u> | <u>FY 2005</u> |
|------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| M7 ODS BFIST | | | | | | | | | | |
| First A2 ODS BFIST Prototype | 4Q* | | | | | | | | | |
| LRIP Milestone Decision | 4Q* | | | | | | | | | |
| LRIP contract Award | | 2Q* | | | | | | | | |
| First LRIP Vehicle Delivery | | | 2Q* | | | | | | | |
| Production IPR | | | | | 1Q | | | | | |
| Production Contract Award | | | | | 2Q | | | | | |
| First Production Vehicle Delivery | | | | | | 2Q | | | | |
| M3A3 BFIST | | | | | | | | | | |
| ECP kit Development Contract Award | | | 4Q* | | | | | | | |
| ECP Approval | | | | | 3Q | | | | | |
| ECP Kit Cut-In | | | | | | 1Q | | | | |
| Vehicle Delivery | | | | | | | 3Q | | | |

* Milestone Completed

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ARMY RDT&E COST ANALYSIS (R-3)

DATE
February 2000BUDGET ACTIVITY
7 - Operational System DevelopmentPE NUMBER AND TITLE
0203735A Combat Vehicle Improvement Programs PROJECT
D344

| I. Product Development | Contract Method & Type | Performing Activity & Location | Total PYs Cost | FY 1999 Cost | FY 1999 Award Date | FY 2000 Cost | FY 2000 Award Date | FY 2001 Cost | FY 2001 Award Date | Cost To Complete | Total Cost | Target Value of Contract |
|-------------------------------|------------------------|------------------------------------|----------------|--------------|--------------------|--------------|--------------------|--------------|--------------------|------------------|------------|--------------------------|
| a. M7 ODS BFIST EMD | C/CPIF | UDLP, San Jose, CA | 35794 | | | | | | | | 35794 | |
| b. BFIST STS | CPFF | UDLP, San Jose, CA | 7755 | | | | | | | | 7755 | |
| c. M7 LRIP | SS/FFP | UDLP, San Jose/York | 1620 | | | | | | | | 1620 | |
| d. BFIST M3A3 | CPAF | UDLP, York, PA | | 4400 | Jul 99 | 7700 | Mar 00 | 1468 | Nov 00 | | 13568 | |
| e. DSESTS | CPFF | PEI, Huntsville, AL | 1874 | | | | | | | | 1874 | |
| f. Other Contracts | | | | 1194 | | 1244 | | | | | 2438 | |
| Subtotal Product Development: | | | 47043 | 5594 | | 8944 | | 1468 | | | 63049 | |
| II. Support Costs | Contract Method & Type | Performing Activity & Location | Total PYs Cost | FY 1999 Cost | FY 1999 Award Date | FY 2000 Cost | FY 2000 Award Date | FY 2001 Cost | FY 2001 Award Date | Cost To Complete | Total Cost | Target Value of Contract |
| a. PM/Govt | MIPR | PMO, Warren, I/AMCOM, Ft Sill , OK | 11904 | 648 | Oct 98 | 586 | Jan 00 | 386 | Oct 00 | | 13524 | |
| Subtotal Support Costs: | | | 11904 | 648 | | 586 | | 386 | | | 13524 | |
| III. Test and Evaluation | Contract Method & Type | Performing Activity & Location | Total PYs Cost | FY 1999 Cost | FY 1999 Award Date | FY 2000 Cost | FY 2000 Award Date | FY 2001 Cost | FY 2001 Award Date | Cost To Complete | Total Cost | Target Value of Contract |
| a. ATC/TECOM | MIPR | ATC, WSMR, YPG | 1554 | 172 | Jul 99 | 1753 | Nov 99 | 300 | Nov 00 | | 3779 | |
| Subtotal Test and Evaluation: | | | 1554 | 172 | | 1753 | | 300 | | | 3779 | |

IV. Management Services: Not applicable

| | | | | | | | | | | | | |
|---------------------|--|--|-------|------|--|-------|--|------|--|--|-------|--|
| Project Total Cost: | | | 60501 | 6414 | | 11283 | | 2154 | | | 80352 | |
|---------------------|--|--|-------|------|--|-------|--|------|--|--|-------|--|

Project D344

Page 10 of 19 Pages

Exhibit R-3 (PE 0203735A)

UNCLASSIFIED

| ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit) | | | | | | | DATE February 2000 | | |
|--|-------------------|---------------------|---------------------|--|---------------------|---------------------|------------------------------|------------------------|------------|
| BUDGET ACTIVITY 7 - Operational System Development | | | | PE NUMBER AND TITLE 0203735A Combat Vehicle Improvement Programs | | | | PROJECT D371 | |
| COST (In Thousands) | FY 1999 Actual | FY 2000 Estimate | FY 2001 Estimate | FY 2002 Estimate | FY 2003 Estimate | FY 2004 Estimate | FY 2005 Estimate | Cost to Complete | Total Cost |
| D371 Bradley Base Sustainment Program | 57787 | 24777 | 0 | 0 | 0 | 9419 | 24503 | Continuing | Continuing |
| <p>A. Mission Description and Justification: The Bradley A3 program upgrades a proven, tracked combat vehicle with digital command and control, increased situational awareness, enhanced lethality and survivability, and supportability/sustainability improvements. This project funds engineering and manufacturing development (EMD) of the Bradley A3. The effort develops and fully integrates digital electronics featuring a 1553 databus core electronic architecture and upgraded vehicle system software packages (command and control, navigation, communications, fire control, system/component diagnostics, and embedded training capabilities), 2nd Generation FLIR, and other systems/components into renovated (overhauled) Bradley A2s. Current plans call for conversion of 1109 Bradley A2s to the Bradley A3 configuration. Program has been extended with a current FUE of November 2000 and a MS III of 1 March 2001.</p> <p>FY 1999 Accomplishments:</p> <ul style="list-style-type: none"> • 42251 Continue Design Engineering Effort • 13422 Complete Live Fire and PQT Testing • 2114 Project Management <p>Total 57787</p> <p>FY 2000 Planned Program:</p> <ul style="list-style-type: none"> • 11086 Design closeout • 986 Combat ID • 978 Digitization • 10108 Testing (IOTE) • 952 Project Management • 667 Small Business Innovative Research/Small Business Technology Transfer Programs (SBIR/STTR) <p>Total 24777</p> <p>FY 2001 Planned Program: Program not funded in FY 2001.</p> | | | | | | | | | |
| <div style="display: flex; justify-content: space-between;"> Project D371 Page 11 of 19 Pages Exhibit R-2A (PE 0203735A) </div> | | | | | | | | | |

UNCLASSIFIED

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)

DATE
February 2000BUDGET ACTIVITY
7 - Operational System DevelopmentPE NUMBER AND TITLE
0203735A Combat Vehicle Improvement Programs PROJECT
D371

| B. Other Program Funding Summary | <u>FY 1999</u> | <u>FY 2000</u> | <u>FY 2001</u> | <u>FY 2002</u> | <u>FY 2003</u> | <u>FY 2004</u> | <u>FY 2005</u> | To <u>Compl</u> | Total <u>Cost</u> |
|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|--------------------|----------------------|
| G80717 Bradley Base Sustainment | 270102 | 299225 | 373270 | 399607 | 394328 | 412440 | 410157 | Cont | Cont |
| GE0163 Spares (Initial) BFVS | 7070 | 9132 | 11516 | 10665 | 10896 | 5143 | 5136 | Cont | Cont |
| G20900 Bradley FVS Training Devices | 12157 | 23338 | 12098 | 2573 | 3154 | 2464 | 2461 | Cont | Cont |

C. Acquisition Strategy: Milestone I/II for the Bradley A3 was held in FY94 and the program was approved for EMD. United Defense was subsequently awarded a Cost Plus Incentive Fee (CPIF) contract for development and integration of advanced A3 systems and components. Ten principal subcontractors, comprising approximately 33% of the contract cost, are participating in the EMD work effort. The first of eight prototypes was completed in 4QFY96; ten LRIP vehicles are currently undergoing contractor and government production qualification testing. Low Rate Initial Production (LRIP) procurements were awarded in FY 1997, FY1998 and FY 1999 with a fourth LRIP of 80 vehicles is scheduled for award 2QFY00. Limited User Testing and Live Fire Testing were completed in FY 1999. IOTE will be conducted in 4QFY00. A MS III decision is anticipated 2QFY01.

| D. Schedule Profile | <u>FY 1999</u> | <u>FY 2000</u> | <u>FY 2001</u> | <u>FY 2002</u> | <u>FY 2003</u> | <u>FY 2004</u> | <u>FY 2005</u> |
|----------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| LRIP Award (Phased Awards) | 1Q* | 2Q | | | | | |
| LFTE | 1-4Q* | | | | | | |
| LOG DEMO | 2Q* | | | | | | |
| Limited User Test #2 | 4Q* | | | | | | |
| IOTE | | 4Q | | | | | |
| MS III | | | 2Q | | | | |

* Milestone Completed

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| ARMY RDT&E COST ANALYSIS (R-3) | | | | | | | | | | DATE February 2000 | | |
|---|------------------------|---------------------------------|----------------|------------------------|--|------------------------|------------------------------|------------------------|------------------------------|------------------------------|------------|--------------------------|
| BUDGET ACTIVITY 7 - Operational System Development | | | | | PE NUMBER AND TITLE 0203735A Combat Vehicle Improvement Programs | | | | | PROJECT D371 | | |
| I. Product Development | Contract Method & Type | Performing Activity & Location | Total PYs Cost | <u>FY 1999</u> Cost | <u>FY 1999</u> Award Date | <u>FY 2000</u> Cost | <u>FY 2000</u> Award Date | <u>FY 2001</u> Cost | <u>FY 2001</u> Award Date | Cost To Complete | Total Cost | Target Value of Contract |
| a. A3 EMD | CPIF | United Defense, San Jose, CA | 275707 | 25485 | Jul 99 | | | | | | 301192 | |
| b. IBAS EMD | SS/CPIF | Texas Instruments, McKinney, TX | 64919 | | | | | | | | 64919 | |
| c. IBAS TPS Development | CPFF | Pentastar, Huntsville, AL | 1863 | 633 | | | | | | | 2496 | |
| d. Other Contracts | | | 34510 | 15903 | Sep 99 | 13717 | Feb 00 | | | | 64130 | |
| e. Reprogramming Action – not in database | | | | 230 | | | | | | | 230 | |
| Subtotal Product Dev: | | | 376999 | 42251 | | 13717 | | | | | 432967 | |
| II. Support Costs | Contract Method & Type | Performing Activity & Location | Total PYs Cost | <u>FY 1999</u> Cost | <u>FY 1999</u> Award Date | <u>FY 2000</u> Cost | <u>FY 2000</u> Award Date | <u>FY 2001</u> Cost | <u>FY 2001</u> Award Date | Cost To Complete | Total Cost | Target Value of Contract |
| a. PMO | MIPR | PMO, Warren, MI | 7019 | 787 | Sep 99 | 672 | Sep 00 | | | | 8478 | |
| b. PM CCAWS | MIPR | PMO, Huntsville, AL | 17353 | 500 | Jan 99 | | | | | | 17853 | |
| c. Other | MIPRs | Various OGAs | 4191 | 827 | Sep 99 | 280 | Sep 00 | | | | 5298 | |
| Subtotal Support Costs: | | | 28563 | 2114 | | 952 | | | | | 31629 | |
| III. Test and Evaluation | Contract Method & Type | Performing Activity & Location | Total PYs Cost | <u>FY 1999</u> Cost | <u>FY 1999</u> Award Date | <u>FY 2000</u> Cost | <u>FY 2000</u> Award Date | <u>FY 2001</u> Cost | <u>FY 2001</u> Award Date | Cost To Complete | Total Cost | Target Value of Contract |
| a. PQT, LUT II, LFTE, IOTE | MIPR | ATC, WSMR, YPG, ARL, DPG, CRTA | 6881 | 13422 | Sep 99 | 10108 | Sep 00 | | | | 30411 | |
| Subtotal Test and Evaluation: | | | 6881 | 13422 | | 10108 | | | | | 30411 | |
| Project Total Cost: | | | 412443 | 57787 | | 24777 | | | | | 495007 | |
| <div style="display: flex; justify-content: space-between;"> Project D371 Page 13 of 19 Pages Exhibit R-3 (PE 0203735A) </div> | | | | | | | | | | | | |

UNCLASSIFIED

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|---|-------------------|---------------------|---------------------|---|---------------------|---------------------|------------------------------|-------------------------------|------------|
| ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit) | | | | | | | DATE February 2000 | | |
| BUDGET ACTIVITY 7 - Operational System Development | | | | PE NUMBER AND TITLE 0203735A Combat Vehicle Improvement Programs | | | | PROJECT D718 | |
| <i>COST (In Thousands)</i> | FY 1999 Actual | FY 2000 Estimate | FY 2001 Estimate | FY 2002 Estimate | FY 2003 Estimate | FY 2004 Estimate | FY 2005 Estimate | Cost to Complete | Total Cost |
| D718 Ground Combat Vehicle HTI | 8846 | 7847 | 12125 | 12512 | 0 | 0 | 0 | 0 | 41418 |

A. Mission Description and Budget Item Justification: Project D718, Ground Combat Vehicle Horizontal Technology Integration (HTI), is a project which was initiated in FY97 for the purpose of developing technology improvements which have application to or insertion opportunities across the spectrum of combat systems. These systems include the Abrams Tank, the Bradley Fighting Vehicle, the Crusader and others. This project funded the Suite of Survivability Enhancements Systems (SSES) beginning in FY97, the Flat Panel Display (FPD) program beginning in FY97 and funds the Common Ground Combat and Support Systems Architecture (GSA) program beginning in FY01. Note that efforts for the SSES program actually began in FY96 under project D661 before establishment of D718.

The SSES program is an HTI initiative to develop, produce and apply Hit Avoidance Technology to Army ground combat vehicles. The program was structured to integrate survivability sensors and countermeasures in a multi-phased effort determined by technological maturity and the availability of funding. Testing of Laser Warning Receivers (LWR) on the Bradley A3 vehicles was continued during FY99/00 with successful results. Funding for the SSES initiatives was discontinued in FY00.

The Field Emissive Display (FED) program, also known as the High Performance Flat Panel Display (FPD) technology development program, is an effort to develop common, multi-purpose displays for Army ground combat vehicles. This includes the capability for real time interpretation and application of command and control, target imagery and situation awareness information. The FPD will also provide common, multi-purpose, and high performance (low power, color, and sunlight readable, high-resolution) system displays. The application of the FPD supports the Force XXI Battle Command – Brigade and Below (FBCB2) operational requirement for the display of common imagery and data in removable and remote operations. In doing so, this program focuses on the near to mid-term opportunity to improve the performance of system displays for both tracked and wheeled combat and combat support vehicles. The high performance FPD program takes advantage of advanced display technologies under development by the Defense Advanced Research Projects Agency (DARPA) by incorporating changes to meet the requirements of ground systems. System display performance specifications will optimize industry standard interfaces allowing incremental and inexpensive upgrades for future information display requirements. This program has been funded through congressional plus-ups, with \$7.0M provided in FY97, \$12.0M in FY98, \$7.0M in FY99 and \$8M in FY00.

CGA meets the critical need for a common digitization implementation across PEO GCSS vehicle platforms. The basis for the success of the Army's digitization effort lies with the ability to collect, process, and disseminate a common situational awareness picture throughout the battlefield. This in turn, is facilitated by a set of common digitization components. The CGA will define a common architecture to facilitate development and integration of common digitization components. Building upon the ongoing digitization efforts and lessons learned by PM's Abrams/Bradley/Crusader to integrate embedded and applique command and control products, the CGA will eliminate unnecessary roadblocks, promote development of common capabilities, facilitate integration, and minimize training and maintenance differences among platforms. As a new critical functionality is required to support the digitized force, these components/interfaces will provide a foundation for common and synchronized vehicle upgrades.

Project D718
Page 14 of 19 Pages
Exhibit R-2A (PE 0203735A)

UNCLASSIFIED

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| ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit) | | DATE February 2000 |
| BUDGET ACTIVITY 7 - Operational System Development | PE NUMBER AND TITLE 0203735A Combat Vehicle Improvement Programs | PROJECT D718 |
| FY 1999 Accomplishments: <ul style="list-style-type: none"> • 280 Government Technical Support – LWR (SSES) • 1780 Government Test and Testing Support for the LWR to include Limited User Test (LUT) and User Evaluation (IOTE) (SSES) • 659 Program Management administration (SSES and FED) • 6127 Design and build high resolution FPD engineering unit (FED) Total 8846 | | |
| FY 2000 Planned Program: <ul style="list-style-type: none"> • 120 High Resolution FED Government Evaluation • 4900 Design & Engineering Improvements • 120 Government Performance Evaluation • 966 HTI vehicle insertion design and engineering • 750 HTI Vehicle insertion evaluation • 340 Performance Specification/ICD Completion/Government Approval • 440 Program Management & Administration • 211 Small Business Innovative Research/Small Business Technology Transfer Programs (SBIR/STTR) Total 7847 | | |
| FY 2001 Planned Program: <ul style="list-style-type: none"> • 2200 Define performance requirements for the common components to be developed • 3000 Develop common component specifications for the performance, size, weight, etc. of the common components • 6925 Design and develop components based on the common component requirements and specifications Total 12125 | | |
| B. <u>Other Program Funding Summary:</u> None | | |
| C. <u>Acquisition Strategy:</u> With regard to LWR effort, we used existing aviation programs and Bradley A3 vehicle testing as well as TARDEC and CECOM Tech Base efforts for the LWR performance specification development. In Phase I, the LWR and Commanders Decision Aid (CDA) were funded for production on the Bradley A3 using the aviation LWR production contract. Later, a fully competitive production contract was to be awarded for the A3. The LWR was to be fielded to the Bradley A3 by approval of an ECP to the vehicle system. In Phase II and beyond, as additional technologies matured, new production contracts were to be competitively awarded for their application to the appropriate vehicle platforms (Bradley, Abrams, Crusader, FSCS, etc.) Each phase also was to return to the aviation community the technology improvements appropriate for these platforms. | | |
| Project D718 | Page 15 of 19 Pages | Exhibit R-2A (PE 0203735A) |

UNCLASSIFIED

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)

DATE
February 2000

BUDGET ACTIVITY

7 - Operational System Development

PE NUMBER AND TITLE

0203735A Combat Vehicle Improvement Programs

PROJECT

D718

For the FED program, technology development and maturation is executed under an existing DARPA contract. The Army is managing engineering design and hardware fabrication via an option to the DARPA contract. PM-GSI is assessing the HTI suitability for combat vehicles via technology demonstrator and engineering prototype unit evaluations performed by GDLS and UDLP. Evaluation results will be used by platform PMs to determine technology insertion applications. A common FED performance specification is being prepared to support HTI acquisitions.

At this time the CGA Acquisition Strategy is comprised of a Management/PMO Strategy and a Contracting Approach. Since this effort seeks to redesign existing vehicle subsystems/LRUs to incorporate commonality attributes, it is expected that existing PMs Abrams, Bradley, and Crusader contracts will be utilized for the majority of work. When this is not possible, fully competitive contract awards will be used to execute CGA efforts. PM GSI will perform the administration management of the CGA Program. This administration includes oversight of all CGA related efforts to ensure defined milestones are being met. The CGA program will be managed through agreements made between all interested GCSS PMs.

| D. Schedule Profile | <u>FY 1999</u> | <u>FY 2000</u> | <u>FY 2001</u> | <u>FY 2002</u> | <u>FY 2003</u> | <u>FY 2004</u> | <u>FY 2005</u> |
|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| LWR Technical Tests | 2Q | | | | | | |
| LWR Vehicle Integration Test | 1-4Q | | | | | | |
| LWR User Eval (IOTE) | 4Q | | | | | | |
| Common FED Spec/ICD Dev | 1-2Q | 1-4Q | | | | | |
| High Resolution Development FED | 1-4Q | 1-4Q | 1-2Q | | | | |
| FED Tech Evaluation | 4Q | 1-2Q | | | | | |
| FED evaluation for vehicle HTI | | 1-4Q | 1-4Q | | | | |
| Transition from PM Digitization Efforts (CGA) | | | 1Q | | | | |
| Component Requirements Definition (CGA) | | | 1-2Q | | | | |
| Component Specifications Development (CGA) | | | 2-3Q | | | | |
| Component Detailed Design (CGA) | | | 2-4Q | | | | |
| Common Component Development (CGA) | | | | 1-4Q | | | |
| Component SIL Experimentation and Test | | | | 3-4Q | | | |
| Component Transition to PMs | | | | 4Q | | | |

Project D718

Page 16 of 19 Pages

Exhibit R-2A (PE 0203735A)

UNCLASSIFIED

ARMY RDT&E COST ANALYSIS (R-3)

DATE

February 2000

BUDGET ACTIVITY

7 - Operational System Development

PE NUMBER AND TITLE

0203735A Combat Vehicle Improvement Programs

PROJECT

D718

| I. Product Development | Contract Method & Type | Performing Activity & Location | Total PYs Cost | FY2000 Cost | FY2000 Award Date | FY 2001 Cost | FY 2001 Award Date | Cost To Complete | Total Cost | Target Value of Contract |
|--|------------------------|--------------------------------|----------------|-------------|-------------------|--------------|--------------------|------------------|------------|--------------------------|
| a. LWR Development | STS/FFP | ROSI, Danbury CT | 3741 | 0 | - | 0 | - | 0 | 3741 | |
| b. LWR Integration | CPIF | UDLP, Santa Clara, CA | 3863 | 0 | - | 0 | - | 0 | 3863 | |
| c. LWR CDA | CPAF | SLM, Nashua, NH | 452 | 0 | - | 0 | - | 0 | 452 | |
| d. FED – Tech Development | Cost/Share | MICRON, Boise, ID | 22761 | 6000 | MAR 00 | 0 | - | 0 | 28761 | |
| e. FED – Technology Evaluation | CPIF | GDLS, Sterling Hts, MI | 275 | | - | 0 | - | 0 | 275 | |
| f. FED-Technology Eval/ Spec Dev | CPIF | UDLP, Santa Clara, CA | 729 | | | 0 | - | 0 | 729 | |
| g. FED-Tech Development | Cost/Share | PIXTECH, Boise, ID | 0 | | | 0 | - | 0 | | |
| h. CGA Component Requirements Definition | TBD | Contractors TBD | 0 | 0 | - | 2000 | Oct 00 | TBD | 2000 | TBD |
| i. CGA Specifications Develop CGA | TBD | Contractors TBD | 0 | 0 | - | 3000 | Dec 00 | TBD | 3000 | TBD |
| j. Component Detailed Design CGA | TBD | Contractors TBD | 0 | 0 | - | 6925 | Feb 01 | TBD | 6925 | TBD |
| k. CGA Component Development | TBD | Contractors TBD | | | | | | | | TBD |
| l. CGA Component SIL Experimentation | TBD | Contractors TBD | | | | | | | | TBD |
| Subtotal Product Development: | | | 31821 | 6000 | | 11925 | | | 49746 | |

| II. Support Costs | Contract Method & Type | Performing Activity & Location | Total PYs Cost | FY2000 Cost | FY2000 Award Date | FY 2001 Cost | FY 2001 Award Date | Cost To Complete | Total Cost | Target Value of Contract |
|---------------------|------------------------|--------------------------------|----------------|-------------|-------------------|--------------|--------------------|------------------|------------|--------------------------|
| a. Eng. Spt – FED | CPIF | GDLS, MI | 0 | 100 | | | | | 100 | |
| b. Engr. Spt. – FED | CPIF | UDLP, CA | 0 | 220 | | | | | 220 | |
| c. Engr. Spt. – FED | MIPR | NVESD | 0 | 20 | MAR 00 | | | | 20 | |
| d. Tech Spt LWR | MIPR | CECOM, NJ | 882 | | | 0 | - | 0 | 882 | |
| e. Tech Spt LWR | MIPR | TARDEC, MI | 225 | 0 | - | | - | 0 | 225 | |
| f. Support Mgt LWR | CPFF | Sig/Rsch, MI | 93 | 0 | - | 0 | - | 0 | 93 | |

Project D718

Page 17 of 19 Pages

Exhibit R-3 (PE 0203735A)

UNCLASSIFIED

UNCLASSIFIED

ARMY RDT&E COST ANALYSIS (R-3)

DATE

February 2000

BUDGET ACTIVITY

7 - Operational System Development

PE NUMBER AND TITLE

0203735A Combat Vehicle Improvement Programs

PROJECT

D718

| II. Support Costs | Contract Method & Type | Performing Activity & Location | Total PYs Cost | FY2000 Cost | FY2000 Award Date | FY 2001 Cost | FY 2001 Award Date | Cost To Complete | Total Cost | Target Value of Contract |
|-----------------------------|------------------------|--------------------------------|----------------|-------------|-------------------|--------------|--------------------|------------------|------------|--------------------------|
| g. Engr Spt LWR | CPAF | Camber, MI | 513 | | | 0 | - | 0 | 513 | |
| h. Training Aid Develop LWR | MIPR | STRICOM, FL | 308 | | | 0 | - | 0 | 308 | |
| i. IBAS Display LWR | MIPR | PM CCAWS, AL | 30 | 0 | - | 0 | - | 0 | 30 | |
| j. Engr Test Spt LWR | MIPR | SLAD (OMI), NM | 672 | | | 0 | - | 0 | 672 | |
| k. CGA Vehicle Spt | MIPR | PMs Abrams/Bradley | 0 | 0 | - | 200 | OCT 00 | TBD | 200 | |
| Subtotal Support Costs: | | | 2723 | 340 | - | 200 | - | | 3263 | |

| III. Test and Evaluation | Contract Method & Type | Performing Activity & Location | Total Pys Cost | FY 2000 Cost | FY 2000 Award Date | FY 2001 Cost | FY 2001 Award Date | Cost To Complete | Total Cost | Target Value of Contract |
|------------------------------------|------------------------|--------------------------------|----------------|--------------|--------------------|--------------|--------------------|------------------|------------|--------------------------|
| a. FED Perf. Evaluation | CPIF | GDLS, MI | 0 | 120 | | | | | 120 | |
| b. FED Perf. Evaluation | CPIF | UDLP, CA | 0 | 120 | | | | | 120 | |
| c. FED HTI Veh. Evaluation | CPIF | GDLS, MI | 0 | 250 | | | | | 250 | |
| d. FED HTI Veh. Evaluation | CPIF | UDLP, CA | 0 | 500 | | | | | 500 | |
| e. CGA Component Transition to PMs | TBD | Contractors, TBD | 0 | | | | | | | TBD |
| f. Field Test LWR | MIPR | RTTC, AL | 68 | 0 | - | 0 | - | 0 | 68 | |
| g. Missile Warning LWR | MIPR | Naval Rsch Wash DC | 35 | 0 | - | 0 | - | 0 | 35 | |
| h. LWR User Eval | MIPR | Eglin AFB, FL | 375 | | | 0 | - | 0 | 375 | |
| i. LWR Tech Test | MIPR | Yuma, AZ | 208 | | | 0 | - | 0 | 208 | |
| j. LWR User Eval | MIPR | Ft. Benning, GA | 130 | | | 0 | - | 0 | 130 | |
| k. LWR User Eval | MIPR | Ft. Knox, KY | 50 | | | 0 | - | 0 | 50 | |
| l. LWR User Eval | MIPR | Other | 174 | 0 | - | 0 | - | 0 | 174 | |
| Subtotal Test and Evaluation: | | | 1040 | 990 | | | - | | 2030 | |

Project D718

Page 18 of 19 Pages

Exhibit R-3 (PE 0203735A)

UNCLASSIFIED

UNCLASSIFIED

ARMY RDT&E COST ANALYSIS (R-3)

DATE

February 2000

BUDGET ACTIVITY

7 - Operational System Development

PE NUMBER AND TITLE

0203735A Combat Vehicle Improvement Programs

PROJECT

D718

| IV. Management Services | Contract Method & Type | Performing Activity & Location | Total Pys Cost | FY2000 Cost | FY2000 Award Date | FY 2001 Cost | FY 2001 Award Date | Cost To Complete | Total Cost | Target Value of Contract |
|-------------------------------|------------------------|--------------------------------|----------------|-------------|-------------------|--------------|--------------------|------------------|------------|--------------------------|
| a. In House Spt LWR | MIPR | PM GSI, MI | 699 | 0 | - | 0 | - | 0 | 699 | |
| b. In House Spt FED | MIPR | PM GSI, MI | 895 | 440 | - | 0 | - | 0 | 1335 | |
| c. SBIR/STTR | | | | 77 | | | | | 77 | |
| Subtotal Management Services: | | | 1594 | 517 | | | | | 2111 | |

| | | | | | | | | | | |
|---------------------|--|--|-------|------|--|-------|--|--|-------|--|
| Project Total Cost: | | | 37178 | 7847 | | 12125 | | | 57150 | |
|---------------------|--|--|-------|------|--|-------|--|--|-------|--|